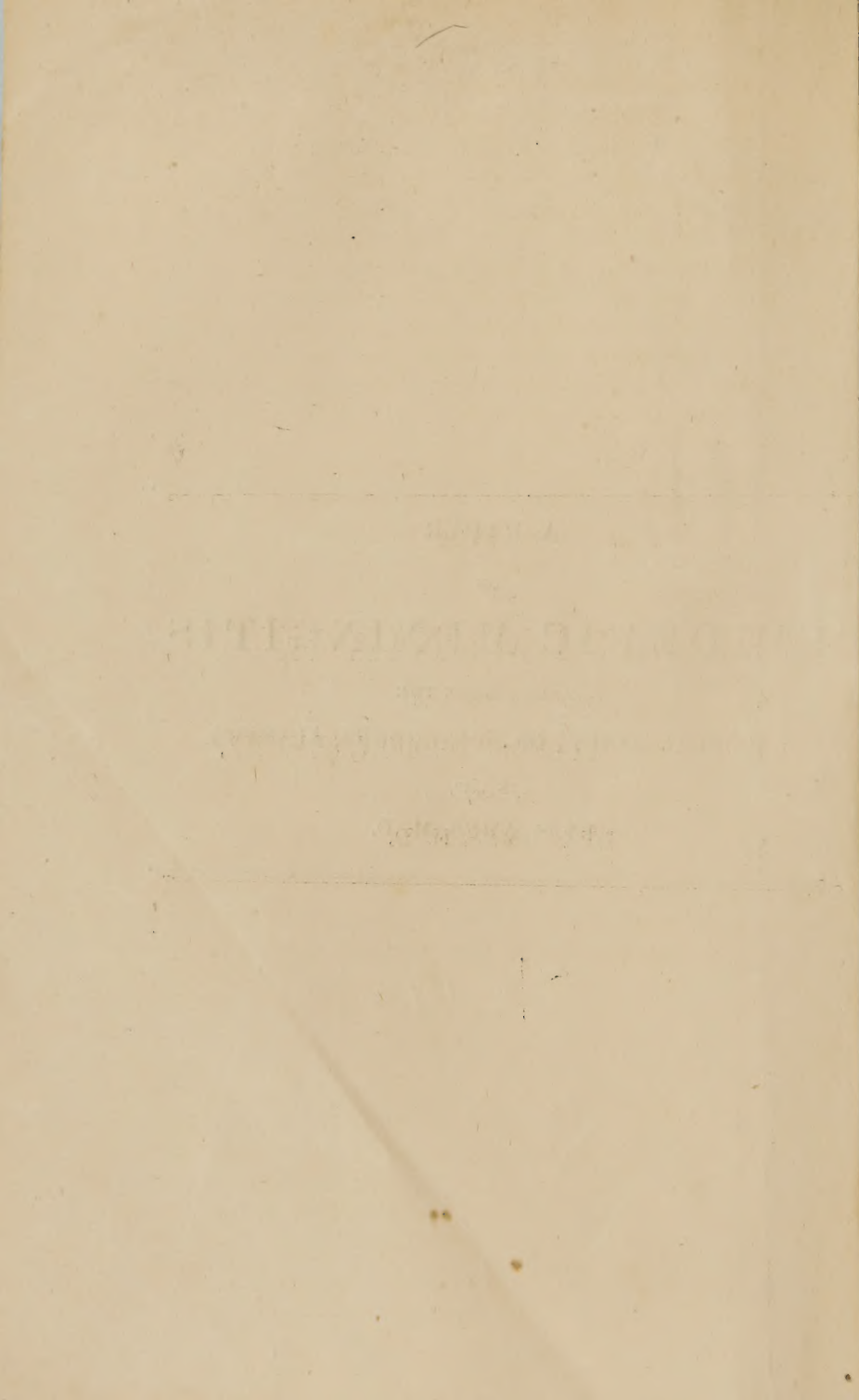


Ames (S.)

A PAPER
ON
EPIDEMIC MENINGITIS,
READ BEFORE THE
MEDICAL SOCIETY OF MONTGOMERY, ALABAMA,
IN 1848, ✓
BY S. AMES, M. D.

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Some Account of an Epidemic Cerebro-Spinal Meningitis, which prevailed in Montgomery, Ala., in the Winter and Spring of 1848. By S. AMES, M. D.

THE name, *Cerebro-Spinal Meningitis*, is not strictly applicable to the epidemic I am about to describe.—Whatever may have been the extent of the organic lesions, in the milder forms, which, it will be seen, the disease frequently assumed, both the symptoms and the morbid anatomy of the malignant forms showed that the substance of the brain, if not of both the great nervous centres, was almost always involved. In some parts of France, which were visited, some years ago, by a similar epidemic, it is said, on the contrary, that the integrity of the brain was the rule, and its alteration an exception, which, when it occurred, ought rather to be viewed as a complication than as a part of the original or primary affection.* This assertion, however, seems to be the expression of an opinion instead of a statement of fact,—the opinion depending, as I conceive, more on the peculiar views entertained by the French pathologists in regard to the post mortem evidences of pre-existing inflammation, than on just conclusions drawn from the morbid anatomy which they observed. Requiring, always, for example, the presence of some product of inflammation, they reject all other evidence, giving no weight to the presence of that vascular condition which, nevertheless, is admitted to be essential to such products. The French physicians,† in describing the epidemic just spoken of, affirm the existence of hyperemia of the brain in, I believe, every instance in which the condition of that organ is noticed, the occasional observation of one of the products, viz: softening, of inflam-

* *Compendium de Medicine Practique.* Tom. vi.

† I refer here more particularly to M. Tourdes (*Histoire de l'épidémie Meningite Cerebro-Spinale qui a regné à Strasbourg, en 1840 et 1841*); and M. Forget (*Gazette Medicale, 1841.*)

mation, and in all the fatal cases the occurrence of symptoms, such as abnormal sensibility and muscular motions, delirium, coma, &c., which, being observed in a disease having a constant excess of fibrine in the blood, may be considered unequivocal evidence of inflammation of the nervous substance—at least so long as there is no proof that simple meningitis can produce them—proof which would almost necessarily be to the effect that the meninges are the seat of the intellectual faculties. If, then, this excessive refinement or incredulity in the French pathological school be set aside, the pathology of the two epidemics is in strict accordance with their resemblance in symptoms, and the anatomical characters have only this difference, that one of the products of inflammation was found in the brain more frequently in the one than in the other,—a state of facts which can leave no doubt as to the identity of the two diseases. I have retained the name, therefore, which has already been applied to the French epidemic, as well as to others, in order to avoid the confusion which might grow out of a description of the same disease under another name. If it were necessary or important, however, to give it a name which would approach somewhat nearer to an expression of its true pathology, that of meningo-cerebritis and myelitis, would better answer the purpose.

MORBID ANATOMY.

The following account of the anatomical characters of the disease is drawn up from notes taken in eleven cases, examined at periods varying from four to twenty hours after death.

Vascularity of the Membranes of the Brain.—The dura mater was the seat of abnormal vascularity in two cases, in one of which there was merely a greater number of vessels than usual displayed on its upper and lateral surface, on the left side; on the other, there were red patches occupying parts on each side and along the entire course of longitudinal sinus, and also that portion which covers the frontal bone just above the orbital plates of this bone; at these places the number of red patches was greatest on the right side. The arachnoid

covering of the dura mater, showed this kind of alteration in one case only; in this there was a very delicate pink or carmine tint diffused over it, while its usual polish was retained. The pia mater showed the usual vascularity of meningeal inflammation in every case. The vessels lying across the convolutions were uniformly red, numerous, and large, being seen, in several instances, many of them as much as a line, or even more, in diameter. The red vessels were equally numerous, but in no instance so large, on the parts at the base of the brain, and on the cerebellum. They were also found in great numbers on the walls of all the ventricles, accompanied occasionally with spots of capilliform injection resembling ecchymosis to the naked eye. Spots of red ecchymosis were observed in different subjects on the lateral walls of the third ventricle, the anterior wall of the fourth, and in the posterior horn of the left lateral ventricle; they were also seen in several cases on the upper surface of the hemispheres and on the cerebellum.

Vascularity of the Brain.—On cutting into the nervous substance, there was found, invariably, besides the red points, as they are commonly seen in congestion, as well as in inflammation of the brain, an infinite number of red vessels, sometimes containing fluid, sometimes coagulated blood. The enlarged vessels occupied different parts in different subjects. They were absent in the hemispheres in but one case; in this the grey matter was a uniform pink color, and spots similarly colored occupied various parts of the white substance. They might be seen also after the membranes were peeled off, ramifying on the several parts at the base of the brain, and on the parts constituting the floors and walls of all the ventricles, as well as on a section of any of these parts. The grey and white matter had also a pink color, which was not dependent on the presence of vessels that were separately visible, and this, too, occupied different parts in different subjects, and was never altogether absent. The medulla oblongata was dotted interiorly with dark ecchymosed spots in two cases. The cerebellum partook of these alterations to a greater or less extent in every case.

Softening of the Membranes.—This lesion occurred in circumscribed portions of the membranes in seven cases, viz: on the exterior of the brain, including the inferior surface of the cerebellum, in four cases, and in the membrane covering the floor of the lateral ventricle in three.

Softening of the Brain.—This lesion was observed in nine cases, viz: in some part of the hemispheres, chiefly in the cortical, in seven cases; in the meulla oblongata and pos varolii, in three; in the fornix and septum lucidum, in five; in the walls of the third ventricle and canal leading to the fourth, and in the infundibulum, in one case; in the corpus callosum and outer semi-circular rim of the left corpus striatum, in one case; in the optic nerves and commissure and tractus opticus, in one case; in the crus cerebri, in two cases, and in the cerebellum in one case. In the latter, the softening, which was also seen, in the grey matter of the hemispheres in the same case, was confined to two spots on the posterior and superior surface of the cerebellum on either side of the median line; at these spots, which looked under the membranes like ecchymosis, a part of the nervous matter was converted into a reddish pulp, which adhered to the membranes so as to tear out with them, leaving a regular and smooth cavity, with white walls, the largest about the size of the first joint of the thumb. A portion of the disorganized mass showed, under the microscope, blood, lymph, and pus globules, the latter largely predominating, with scarcely a trace of neurine.*

Thickening of the Membranes.—The arachnoid was thickened and opaque where it covers the anterior sub-arachnoidean space in three cases, and where it covers

* If the reader require any further evidence that this is an instance of inflammatory softening, in which Dr. Bennett (Med. Chir. Rev. Vol. LX., p. 460) says, the purulent, infiltration has no existence, he may consult the history of the case at page —, case 11. This kind of softening, in exact appearance, at least to the naked eye, occurred in several other instances; in one the seat of it was the external posterior surface of the medulla oblongata, and in another, the anterior surface of the tuber annulare. In other cases, the softened parts were whiter than the normal brain, and in others the natural color remained unchanged.

the posterior sub-arachnoidean, in one case. This alteration could be easily demonstrated at these places, so as to leave no doubt as to the fact. There was an appearance of thickening in other places, but this was not certainly ascertained by separating the membrane from its connections.

Effusion.—There was an effusion of yellowish colored matter, showing under the microscope an abundance of pus and lymph globules, on some part of the membranes covering the exterior surfaces of the brain in ten cases. In the greater number, enough of the effused lymph was coagulated to give some cohesiveness to the morbid product, but not enough to give it the appearance of an organized membrane. In appearance and consistence it resembled a very loose coagulum of fibrin. It was always found under the arachnoid covering of the pia mater. In some cases it was so diffused under the membrane on the hemispheres as to look like a coating of cream, or, rather, as if the membrane had a cream color; in others it was confined, on the convex surface of the hemispheres, to the course of the large vessels between the convolutions. At the base of the brain this lympho-purulent deposit was largest and found most frequently about the optic commissure—indeed, at this place, either on the commissure and mammillary bodies, or between them and the tuber annulare, it was never absent. In one case, it was found only at this place, the interstices of the convolutions being occupied by a serous fluid containing a few pus globules.—In several instances it projected from the arachnoid membrane into the sub-arachnoidean spaces, a line or more in thickness; and once, the anterior cavity was occupied and even distended by it. It was found, also, on the corpora quadragemina, the medulla oblongata, and around the third pair of nerves, where they penetrate the arachnoid membrane. The exterior surface of the cerebellum was frequently the seat of this deposit.*

* The facts lead to the inference that this effusion was exclusively a product of the under or inner surface of the arachnoid. The reader will have noticed that it was not found in any of the ventricles, where

An effusion of fluid into the arachnoid cavity was found in nine cases. With this effusion, pus globules were mixed in uncertain proportions in every case in which they were sought. In two cases the effusion chiefly consisted of pus, mixed with blood globules. In one case, that in which the arachnoid membrane had a pink color, a small quantity of the effused fluid, after standing a short time, coagulated; this was not submitted to the microscope. In one case, the cranial portion of the arachnoid was the seat of an organized false membrane. In some places this organized effusion was soft and but slightly adherent to the true membrane; but, in other places, and in large patches, it was quite as strong as the arachnoid at the base of the brain, and adhered with a good deal of firmness. Its color was rather a dingy pink, and from its surface everywhere pus could be scraped.

A morbid effusion was found in the lateral ventricles in four cases; in one it consisted of a cream-colored layer, semi-fluid, on a part of the left corpus striatum; in another, there was about a drachm of greenish colored pus; in another, there was serum, made turbid with flocculi; and in another, there was serum, mixed with pus and blood.

Fibrous Concretions.—Concrete fibrin was found in the vessels of the brain in several cases, viz: in the internal carotids, in two; in the basilar artery, in one, [a dark coagulum of blood was found in this artery in one case, and black fluid blood in another], and in the longitudinal sinus and veins leading to it, in another; the concretion in this case occupied the entire length of the large vessel, and extended from it into the smaller vessels, from which threads of fibrin were drawn out to the length of several inches.

Spine.—Several partial examinations of the spinal cord were made, in which the lesions, it may be said generally, were the same as those found in the brain in

the membrane is said not to extend, nor between the convolutions, and that it was found on the inner surface of the membranous walls of the anterior and posterior sub-arachnoidean spaces, having, in more than one instance, no intimate connection with the pia mater.

the same cases. The intense vascularity of the pia mater was always present, but the lympho-purulent deposit and the injection of the cord proper, were less common than in the brain. The spine was opened in its whole length in one case only. In this the dura mater had the color of muscle, which was uniformly diffused over every part of it, the internal surface being divested of its polish. It was thickened, also, in its whole length, but not equally; its arachnoid covering was also thickened in the parts which were separately examined after maceration. The cervical portion of the cord was softened in every part, presenting, in color, various shades of white, yellow and red; the filamentous portion exteriorly being reduced to a disorganized pulp, which came off with the pia mater, and adhered to the finger when touched; the color of this part, without being brilliant, was a pure and beautiful white. This alteration was found principally in the upper part of the cervical expansion of the cord; nearer the dorsal portion, where the softening was rather less, the color degenerated into a dingy yellow of several shades. The vesicular matter of this part of the cord was less altered than the fibrous—though much softened it would bear division with the scalpel; its color, in some parts, was pinkish, and in others, a more or less dull red. Besides this general coloring, a transverse section of the firmest parts showed a number of red and dark dots and striæ. In the dorsal division, the grey matter was more softened than the white, the softening becoming more decided in proceeding downwards. The pure white color was not observed in this division; the yellow tinge predominated, intermingled here and there with shades of dull red. The deposit of lympho-purulent matter was found chiefly about the roots of the anterior cervical nerves, being decidedly greater on the right than on the left column.*

Abdomen.—In other parts of the body no lesions were observed, which seemed to be other than accidental, or

* The reader will find the history of the symptoms of this case at page —, case 5th. In connection with the post mortem appearances, it presents some points of interest to the physiologist as well as to the pathologist.

particularly worthy of note, except those found in the digestive tube, and mesenteric glands. Here the alterations were so constant as, even in the few cases examined, to denote something more than a casual complication. The abdomen was opened in five cases. In all of them the mucous membrane of the stomach and the ileum, to a greater or less extent, was reddened, thickened and softened. In the stomach, this alteration was found mostly in the smaller curvature, about the cardiac orifice; the parts immediately about the pylorus were not observed to be softened in either case. In the ileum, the examination was confined to the lower part, in extent from one and a half to four or five feet. In all but one, the membrane was most altered in that part nearest the cœcum; in the case excepted the membrane was equally affected throughout the portion examined—about five feet; in four cases, including the latter, there were lesions of the agminated, solitary, and mesenteric glands, which, on account of the circumstances under which they were found, became the subject of particular attention and interest, and seem to require here a somewhat detailed notice.

Case 1. T. H., white male, aged 14 years. Attack sudden. Death on the second day. Ex. 6 hours after death. A part of the ileum next to the cœcum was taken out and washed. The mesenteric glands near this part of the gut, as also for some distance above it, were enlarged and red, but not perceptibly softened. Its internal surface had a deep red color imparted to it by the injection of the sub-mucous cellular tissue, the vessels forming a beautiful arborescence under, and immediately around the elliptical plates, where they were largest and most numerous. On raising portions of the mucous tissue its color was found to be rather a pale red. There were three elliptical plates in the parts examined, all of which were elevated above the adjacent surface half a line or more; their surfaces were covered with prominent granules, which slightly roughened them to the touch; and the cellular tissue beneath was thickened, apparently to the extent of the elevation of the plates, and softened. The lower plate was more deeply

colored, and more elevated than the one immediately above it, which was itself more altered in these respects than the third. A great number of the solitary glands were also enlarged and elevated. For the further history of this case, see case 12.

Case 2. J. H. White male, aged 12 years. Attack sudden: death on the fourth day. Ex. twenty hours after death. The mesenteric glands were enlarged and red. About four feet of the lower part of the ileum was taken out and washed. The mucous membrane was more or less reddened, softened and thickened, throughout this part. There were found in it eight of the agminated, and a great number of the solitary glands, in a diseased state. In all of the former, the elevated and granular aspect was very obvious, but not equally so in all. The difference, however, did not offer a regular gradation of changes from below upwards; those most altered were, as in the preceding case, nearest the colon, but next to these there were others which were less altered than those further up. Under the glands, the cellular tissue was thickened and softened. There were no symptoms of abdominal disease in either of these cases. The further history of this may be found in case 11.

Case 3. Black male, aged 3 years. Attack sudden: death on the second day. Ex. eighteen hours after death. In this case, in addition to the alteration in the intestinal glands, which corresponded very nearly with that of case 1, a great many lumbrici were found in the part taken out. The mesenteric glands were not altered. There was acute pain in the abdomen, on the first day; there was no vomiting, and the bowels were constipated.

Case 4. May, black male aged 17 years. Attack sudden: death on the fifth day. Ex. 6 hours after death. The mesenteric glands, to a great extent, along the ileum, were enlarged, dark red, and much softened. About five feet of the lower part of the ileum was taken out and washed. Opposed to the elliptical plates, on the external surface were patches of mottled purple, corresponding with the plates in size. The internal surface had a deep and rather dark red color, ex-

cept immediately around and in the ulcerated glands, presently to be described. The deep redness was owing to the injection of the sub-mucous cellular tissue; the mucous membrane when separated being less deeply colored than the general appearance of the mucous surface indicated.

The agminated and solitary glands presented the following alternations; The inner surface of the gut, in the whole extent examined, was thickly embossed with nodules, elevated from a line and a half to two lines above the adjacent membrane, and differing from each other in size and color. These nodules represented the solitary and agminated glands. The glandular structure of all the elliptical plates, and of a great number of the solitary glands, with the mucous membrane of which they form a part, was entirely destroyed by ulceration. The edges of the ulcers, formed out of deep rose-colored mucous membrane, were abrupt and irregular. The place of the glands and of the cellular tissue under them, was occupied by a dingy yellow substance, whose surface was a little depressed below the edges of the ulcers, so as to give a well-marked prominence to the rose colored zone, from which it was separated by a line, which I supposed, indicated the beginning of a sloughing process. The consistence of this deposit was nearly that of crude tubercle, and, like that, it was friable. Its surface was smooth, or, at least, presented no very marked irregularities any where but in the largest gland, nearest the cœcum, where it was irregularly grooved or pitted. It rested on the muscular coat, which remained unaltered—no trace of the normal cellular tissue could be found in it. The same substance occupied the place of the sub-mucous cellular tissue under the solitary glands. There was no apparent diminution of disease in proceeding upwards to the extremity of the section examined—a fact which renders it probable that the whole, or at least, the greater part of the ileum was involved in it.* This patient had neither

*All of the post mortem examinations, that I made or witnessed, were more or less incomplete, for want of time. The usual course was to take away the part or parts which were the objects of particu-

vomiting, nausea, nor diarrhœa. He took a dose of castor oil on the first day of the attack, which acted very gently; on the second and third days his bowels were constipated; on the third day he had pain in the abdomen, with tenderness on pressure, and some tympanitic distension, to relieve which he took some cathartic medicine, which, operating in the evening of the same day, gave entire and permanent relief to the pain, distension and tenderness. With the exception of these symptoms, lasting but a few hours on the third day, the very formidable disease of the abdomen was effectually masked by the brain disease.

Blood.—The blood taken from the arm, and by cups from the back of the neck, presented some physical characters which, considering the nature of the disease, were peculiar, and sufficiently uniform to assist in the diagnosis of some equivocal cases. It coagulated with great rapidity, so much so, that I was foiled in several attempts to ascertain its density by the hydrometer, forming a large and loose coagulum in which all the corpuscles were rarely included. The serum separated from it very slowly, and in small quantity. Its color was generally bright—in a few cases, nearly approaching to that of arterial blood; it was seldom buffed: in thirty-seven cases in which its appearance was noted, it was buffed only in four. The blood an analysis of which is given below, was taken early in the disease from the arm, and was the first bleeding in each case. The first was from a laboring man, thirty-five years old; the second from a boy of twelve years old, while comatose, and the two others from stout women, between thirty and thirty-five.

lar interest, and inspect them afterwards, as time permitted. In this way the examinations of the interior of the intestines were made, so that any questions of new interest arising during the examination which would have led, if practicable, to further enquiry, had to be overlooked or left to conjecture.

1.	
Sp. gr. of defibrinated blood,	1053,50
“ Serum,.....	1026
Water.....	767,87
Solid contents	232,13
Fibrin	6,40
Corpuscles	140,39
Solid residue of serum .	85,34
2.	
Sp. gr. of defibrinated blood,	1046
“ Serum	1022
Water.....	813,83
Solid contents	186,17
Fibrin	5,28
Corpuscles	112,79

Solid residue of serum68,10

3.	
Sp. gr. defibrinated blood	1046,50
“ Serum	1024
Water	796,07
Solid contents	203,93
Fibrin	3,64
Corpuscles	123,45
Residue of serum	76,84
4.	
Water.....	787,37
Solid contents	212,63
Fibrin	4,56
Corpuscles	129,50
Residue of serum	78,57

SYMPTOMS.

The analysis of symptoms which follows is made from notes taken in sixty-four cases; this number consequently, is to be taken as the standard of comparison where the proportion is not otherwise stated.

Mode of Access.—Premonitory symptoms occurred in forty-three cases. In all of these, pain in some part of the head was a prominent and constant symptom. The cephalalgia was not so acute in this stage, as after the attack was formed, except in those cases of the latter where the premonitory symptoms were followed by a comatose state, in which the sensibility was blunted by oppression of the brain. It was generally continuous, but occasionally it was observed to be remittent or intermittent, with or without regular periods. Its seat was commonly in the forehead, temples, superciliary ridges of one or both sides, or the occiput; sometimes it occupied the whole head, being in such cases most acute under the frontal or occipital bones. In a few instances among persons who had been subject to attacks of sick head-ache, the premonition assumed this form, and to such cases, nausea and vomiting, as a premonitory symptom, was strictly confined. In the greater number, the head-ache was the only warning given, but sometimes there were added some pain along the course of the spinal column, particularly in the neck;

soreness in the muscles or joints; facial neuralgia; and very rarely, giddiness, with or without dimness of vision. There was but little impairment of the strength, and but little complaint of a general feeling of malaise; persons seldom left their employment, whatever that might be, before the attack was fairly begun. As a general rule, the appetite was but little affected, though it was occasionally lost, or a great deal diminished. In a few cases, the disease was developed on a relapse from intermittent fever, showing itself in the cold stage of the second paroxysm. The length of the premonitory stage was very various, nor did the time of its continuance afford any indication of the severity of the approaching attack; the most malignant sometimes giving several days' warning, and at others, making the attack without even a momentary precursory symptom. The premonition lasted less than twelve hours in eleven cases; twenty-four hours, in eight; two days, in five; three days, in six; four days, in four; five days, in three; six days, in one; seven days, in three; and over seven, in two. The hour at which the full development of the attack began, I find noted in twenty-seven. Of this number, nineteen began between 12 M. and 12 P. M., including the former and excluding the latter hour.

Mode of Attack.—The disease was ushered in by some degree of chilliness, never amounting to rigors, in twenty-eight, of which eighteen had had premonitory symptoms. The chill was generally short, being followed in a few minutes, but sometimes not for half an hour, either by a decided febrile reaction; a state of stupor more or less profound, with a cool skin and feeble pulse; or, this condition of the skin and pulse, without stupor. When there was no chill, the development was sometimes manifested by the sudden advent of a comatose or apoplectic state—a degree of stupor not amounting to coma, accompanied by a feeling of excessive debility, giddiness, dimness of sight, or double vision; or, by a sudden aggravation of the premonitory cephalalgia, accompanied by various changes in the condition of the pulse, skin, &c.; or, as in a few instances, the premonitory head-ache increased gradually day

by day, with but little change in the skin or pulse, until at last the patient was compelled to take his bed.

State of the Skin.—This was noted in fifty-seven cases : of these, the skin was *dry* on the first day in forty-two ; of these, it had the natural temperature in fourteen, was below the natural temperature in seventeen, and above it in eleven ; it was *moist*, on the first day in fifteen ; of which the temperature was natural in four, below natural in three, and above natural in eight. The dryness, which it is seen was so common, even with a low temperature, sometimes predominated throughout the attack when it ran its course quickly. In these cases, it proved to be very unyielding to remedies, particularly so to losses of blood. I have noted in several instances, that patients were bled to the verge of syncope, and this repeated within an hour or two, without affecting it. Death took place in more than one instance with a dry skin in the moribund state. Generally, however, in the progress of the attack, the state of the skin varied a good deal in regard to dryness and moisture, being dry or moist at different periods on the same day, or on different days, without any regularity, or any apparent dependence on the action of the heart. The temperature was not usually so changeable ; very frequently there was no change in this respect during several days, and but very rarely was any observed on the same day ; this kind of change, too, when it did occur, seemed to follow certain changes in the pulse, from a weaker to a more active state. There never was any pungent heat in the skin ; in the greater number in which it was above the natural temperature, it was still below ordinary febrile heat ; nor was the head ever warmer than the trunk, though the extremities might be cool when the head and trunk were warm, but this was not very common. When, however, the skin was elsewhere cool, it was always cooler or positively cold on the feet or hands. In some instances the skin was abnormally sensitive to the touch, particularly on the extremities ; the scalp was sore in one case only. An eruption around the mouth (herpes labialis) was observed in three cases. Petechial purple spots, which did

not disappear on pressure, in one case. In some the face was flushed and the skin clear; in others, the face was pale and the skin sallow; the lips were always deeply colored. In one case, the skin had a peculiar shining or glistening appearance, at the beginning of the attack. These observations concerning the color and petechiæ, of course refer only to white persons, which, it will be seen, formed a small proportion of the whole number.

Pulse.—It may be said generally, in regard to the pulse, that it was slower, smaller and softer on the first day than in health; and very irregular in the force of its beats, in the time between them, and in their number to the minute, in the same, as well as in different subjects. To this general character, however, there were many exceptions, appertaining to certain varieties or forms of the disease, which will be pointed out more particularly in another place. The softness of the pulse was its most constant feature. I find it noted *corded*, or hard, in but one case; and those instances in which it rose above the natural fullness were very rare. A pulse slower than that of health, was less common than either of the preceding. In general, it was slower on the first day than afterwards; in the greater number it was below 76—in many below 60, in others below 50, and in several below 40. The same remark is applicable to the irregularity of the pulse. Its irregularity in the number of beats to the minute, was remarkable and characteristic. It is thus noted in one patient on the first day. 10 o'clock A. M., 76; 12 M., 96; 5 1-2 P. M., 68; 9 1-2 P. M., 96; 9 3-4 P. M., 76; and so varying on the second day between 120 and 150. On another occasion, the pulse on the first day, during several hours was continually varying its number to some figure between 30 and 76. There was one remarkable exception to this kind of irregularity, in which the pulse stood steadily at 100 throughout the attack, which lasted three days, having been counted frequently, and the last time but half an hour before death. These characters of the pulse—slowness, softness and irregularity, were not confined to the more violent or malignant varieties of

the disease; but were observed in some of the very mildest attacks, in which there was no other evidence of serious organic lesion—and on the other hand, the smallness and feebleness were but little marked in the beginning and through the progress of some of the most malignant cases.

Very few notes, I find, were made concerning the action of the heart; so far as its sounds were observed, they were never less feeble than in health, nor in other respects offered any peculiarity.

Tongue and Mouth.—The tongue underwent two kinds of changes from its natural state, one or the other of which, with a single exception, was always seen at the beginning, and, (if there were no considerable complication,) through the whole course of the attack, even if greatly protracted. They were exhibited separately, in one of the two principal forms of the disease, and will be referred to hereafter, in describing these varieties.

The first kind that I shall refer to, occurred most frequently in one of the more grave or malignant forms of the disease. In this kind, the tongue was broad and flabby, filling up the mouth sometimes, so as to impede articulation, and press against the teeth, which formed by the pressure indentations on its edges laterally as well as anteriorly. In one case a portion of the tongue by its enlargement, was protruded constantly beyond the front teeth, and in a few others the pressure produced on the thick edges anteriorly, a line or raphe, resembling that on the gums of an infant. A short time before death, the thickening and elongation were apt to increase. The coating which was usually of a pale ash color, or white, but sometimes yellowish, very often covered the whole of the free surface of the tongue, always the whole of the dorsum, and a part at least of the edges, being thinner at the tip and sides, and thickening backwards and towards the centre. With this state of the tongue, there was always an abundance of saliva, which being generally more viscid than in health, had sometimes the consistence of thick mucilage; when the coat began to give way, its edges became abrupt, and the clean edges of the tongue assumed the bright pink

color belonging to the alteration next to be described.

In the other kind of alteration which I shall designate the *second*, the tongue was less obviously enlarged; being generally broad, however, though not often thickened nor indented by the teeth. The coating which was always present, had the color of the first, but it never occupied more than three-fourths, sometimes not more than one-half of the dorsum; beginning thin before, as if it were coloring matter incorporated with the epithelium, and generally thickening backwards. The parts uncovered, particularly the end and sides of the anterior two-thirds, had a bright pink color, which was very peculiar and striking. As the disease advanced towards a fatal termination, it was not uncommon for this condition to assume that of the other, in all its characteristics. In neither of these conditions was the tongue ever dry on the first day. It became dry after the first day, in five cases, viz: on the second, third, fifth, sixth and seventh day.

Cephalalgia.—This proved to be a very important diagnostic symptom. It was absent throughout the attack in but one case in which there was consciousness enough to answer a question. Those persons who had been subject to spasmodic or neuralgic head-ache, uniformly spoke of the pain from this disease as different from any they had ever experienced before. Some described it as consisting of a continued painful roaring; others as a fullness and tightness, as if a tight band were drawn round the head; or, as if the forehead or crown, or sides were being crushed inwards. A greater number described it, as darting and throbbing, frequent shooting or darting through the head from behind forwards, and from side to side and of such violence as to cause the patient to cry out. It occupied in some the temples, superciliary ridges, and frontal region; in others, the back of the head only; but in the larger number, it was felt in the whole head, being more violent in some one of the places just mentioned, or under the parietal bones.

The intensity of the head-ache was by no means pro-

portioned to the severity of the other symptoms ; in some of the worst cases the pain was but little complained of, being obtunded, as it were, by the cerebral oppression ; but it was sometimes slight also, in cases of equal malignity, when there was no want of intelligence and sensibility ; and, on the other hand, it was at times intense and almost insupportable when the disease assumed its mildest form. It was continuous with the attack in but few instances, disappearing towards the close of the first, or on the second, third, or fourth day, to return generally after an uncertain interval. It was generally aggravated by an erect or semi-erect posture, though in two instances, such a position relieved it very much whenever it was assumed. In a number of cases the cephalalgia was aggravated by pressure on some part of the spinal column, chiefly the cervical—a pain was said by the patient to dart from the point pressed on through the head to the eyes and temples. The pain so produced was spoken of as very acute ; on one occasion, the patient, a young lady, begged me with the most earnest and moving entreaty, to desist from a very slight pressure on the fourth cervical vertebra, and to refrain from repeating it ; she complained of the intense agony produced by it during some minutes—the case proved fatal.

Giddiness.—This was rarely complained of after the first few hours of the attack. It occurred in but few cases, and was never a prominent nor an important symptom.

State of the Senses.—The conjunctivæ were generally injected, and the eyes glittering and watery ; in a few cases, principally among children, the conjunctiva had a pinkish tint, when there were no distinct vessels to be seen. The pupils were dilated in seven out of forty-one cases in which their condition was noted ; in the rest, they were either contracted or natural ; they were insensible to light from coma, in three cases, and insensible without loss of consciousness (amaurotic,) in two cases, in both of which perfect vision was restored in a few hours, and both of whom died apoplectic. Double vision occurred in six cases ; painful sensibility to light

occurred also in six cases ; in a number of others, there was enough of abnormal sensibility to make the ordinary light disagreeable, but in far the greater number, the strongest light was not complained of.

In several cases, there was a profuse discharge from the nostrils of thick mucous, alone or mixed with blood. In one patient, the sense of smell was lost in one nostril. Spontaneous deafness was noted in a few patients, in one of whom there were three exacerbations of it on the second day, each lasting about three hours, with intermissions lasting about the same time.

State of the Mind.—Some degree of stupor, amounting in most instances to profound coma, was present on the first day, in eighteen cases ; and there were a few others, in which it appeared on the second or third day. In the greater number this symptom passed off within twenty-four hours, but in others not for two or even three days, generally to return at some subsequent period, varying from twelve hours to several days ; sometimes it did not return at all, though the disease were protracted to many days—there were cases again in which it did not remit, but these were such only as proved speedily fatal. Delirium, with or without stupor, occurred at some period of the attack in twenty-four cases ; unlike the stupor, it was never continuous, sometimes lasting but three or four hours, and rarely ever more than twenty-four. It was wild and furious in two cases only, and playful in one ; in a few it was melancholy and pathetic, the voice being subdued and the tone and language touching. The mind was generally desponding and apprehensive, so much so that even in the delirium, fears were not unfrequently expressed in regard to the result of the attack. There was in all the more violent cases, forgetfulness of the events which transpired during the attack, not only after it was ended, but frequently from day to day while it continued ; and this, whether delirium or stupor was present or not.

State of the Muscles.—The posture commonly assumed was on the back, with the lower extremities extended. There was never any disposition to assume the foetal position, or a near approach to it. In two patients

both comatose, a position was taken on the right side, and maintained with great pertinacity; in another, in which there was continued opisthotonos, the position taken and kept during the greater part of several days, was on the chest and abdomen, the head being kept elevated, or if resting on the arm or pillow, was still thrown considerably backwards; in other cases when the head was thus drawn back, the decubitus was on the side. Tonic contractions of the extensors of the back occurred in three other cases, in each of which a similar action in the extensors of the head was also observed; but the latter was observed also in a number of patients, in whom the extensors of the back were not affected. Besides these cases of tetanic contraction of the muscles of the neck, the latter were affected with stiffness and soreness in thirty-five cases. In a few of them, the affection was confined to the sterno-mastoid muscles of one or both sides; but in the others the extensors were principally concerned; the head in these cases, instead of being drawn back, as in the more active contractions, was steadily kept in the natural position (of the head) when the body is erect, either involuntarily or voluntarily as the easiest position.

Quivering of the muscles of the face, tremors of the hands, and embarrassment in the movements of the arms; tonic contraction of the flexors of the fore-arm, and of the recti muscles of the abdomen were, one or more of them, observed in several cases; subsultus tendinum, picking at the bed clothes, and reaching after imaginary objects, with other typhoid symptoms, occurred in three protracted cases. Strabismus occurred in nine cases; convulsions coming on towards the close of the attack, in three cases; and at the beginning of the attack in one case.*

*Dr. Abercrombie (Path. and Practical researches, &c.) seems to consider that meningitis most commonly attacks by general convulsions. Dr. Watson reiterates this opinion. Both, however, were treating of sporadic meningitis. The observations of others, of the French physicians particularly, are more in accordance with the fact stated in the text. For example, in Andral's cases, if I remember aright, convulsions are not mentioned among the symptoms at all. Dr. Abercrombie's cases are themselves far from satisfactory in proof of

An incomplete paralysis of the right eye-lid occurred in one case, and of one entire side of the body, in another—one of the mildest kind, in which the symptoms previously indicated that there was no serious affection of the brain or spinal cord. In a few cases, there was a general soreness of the muscles, which gave rise to a great deal of pain in moving.

Spine.—Pain in the cervical division of the spinal cord occurred in twenty-three cases; in the dorsal, in eleven; and in the lumbar, in six. In all but two, the pain was slight, many making no mention of it, until they were questioned, and others complaining of it less than patients generally do in remittent fever. A more remarkable feature in the symptoms of the spinal disease I have already had occasion to refer to, viz: the effect of pressure on the cervical and dorsal vertebræ. This, when applied to the cervical part of the column, produced pain in the head, frequently darting from the spot pressed on to the forehead, eyes and temples, in twenty cases. In two, during the existence of deep coma, pressure on the upper dorsal vertebræ occasioned great restlessness and apparent distress. Pressure on the cervical vertebræ produced, also, pain at the top of the sternum—on the dorsal, pain in the middle of the sternum, at the epigastrium, or about the umbilicus, as it was made higher or lower. Sometimes pain was not experienced in the part pressed on at all, but only at some one of the places mentioned above. The pain so produced was often violent, and not always transient, continuing sometimes for several minutes. In one case, the patient, a black woman, cried out from a slight pressure on one of the upper dorsal vertebræ, saying “you hurt me all over,” and she recurred to the circumstance more than once afterwards, with much bitterness of complaint.

the general conclusion, for I find that the ages of his patients, in whom this symptom occurred, were, with one exception—a girl of fourteen—under twelve years, and a great majority of them under eight; proving if anything, only that the fact may be true in regard to children, although my experience, neither in the sporadic disease, any more than in this epidemic, tends at all to confirm even the latter conclusion.

Stomach and Bowels.—Vomiting occurred in fifteen cases—at the beginning of the attack in two—at a later period on the first day, in eight; not till the second day in three, and not till the third day in two. There was nausea, without vomiting, in three cases; one on the first, and the two others on the third and fourth days.

The bowels were either natural or constipated in every case but one, in which diarrhœa occurred on the sixth day, probably from the use of tartar emetic for a pneumonic complication. There was acute pain in the abdomen in three cases, and tympanitic distension, with tenderness on pressure, in one, occurring on the third day.

Appetite—Thirst.—A desire for food, more or less urgent, was expressed in eight cases, at such times as obviously pointed it out as a symptom of disease, and not as a sign of convalescence, or of its near approach. The desire was evinced in some on the first or second day; in others, protracted cases, on the eighth or ninth. It was rather urgent in two or three patients, and in one continued to be so for several days.

Respiration.—This I find noticed in twenty-five cases. The most remarkable feature concerning it, was the absence of stertor, which occurred in only two; another feature worthy of notice, was the number of respirations to the minute—in five only it was below twenty-one, in two of these it was twenty, and in one fell as low as eight; in five, it was between twenty-six and thirty; in eight, between thirty and forty; in five, between forty and fifty; and in four, from fifty-two to fifty-six, all of them being counted on the first or second days, and before the breathing had become affected by the approach of death—generally the breathing was regular. I noticed it as suspirous in one instance.

Physiognomy.—The expression of the countenance was exceedingly various, and variable, affording little or nothing which was available in diagnosis, or prognosis. It was frequently natural even under the influence of the most fatal symptoms; in not more than two instances, and in these after the disease had been long protracted, was there anything of idiocy in the expression? When

it was neither natural nor idiotic, the various shades presented may be expressed by the words, wild, anxious, or distressed, melancholy, heavy, and lastly as was rarely the case, however, brilliant and pleasing; and several of these varieties of expression were observed in the same patient at different periods during the attack, and occasionally at different times on the same day.

Emaciation.—Extreme emaciation occurred in but a small proportion of even the protracted cases. In far the greater part of the whole number there was none perceptible. In one, however, it took place suddenly, in a manner which could not be accounted for by the extent of the evacuations, for they were inconsiderable, on the accession of an acute and very formidable gastro-enteritis,—induced probably, by tartar emetic—which appeared on the sixth day.

Duration.—This disease seemed but little disposed to observe the usual critical days of the endemic diseases of this locality, which are the fifth, seventh, and ninth—particularly the ninth. The extremes of duration were fifteen hours, and fifty days. Between these periods inclusively, there were three which terminated on the fifth day, none on the seventh, and three on the ninth, while there were sixteen which terminated on the second and third, and nineteen on the fourth. Besides these there were two which proved fatal within the first twenty-four hours, and two which lasted over forty days; one terminated on the fourteenth, and nine between the fourteenth and thirtieth—making fifty-five cases to which the notes have reference.

FORMS.

The disease assumed a great variety in its aspect, and a distinctness in the varieties, which was very remarkable. I do not refer merely to shades of violence, nor to modifications occasioned by serious complications, in which the disease might still preserve its identity by the symptoms alone; but to more palpable differences seemingly dependent on other causes, connected perhaps essentially, with the epidemic constitution of the atmosphere; and of such kinds, as to very much embarrass the diagnosis for some time after the

epidemic first made its appearance. Various as the forms were, however, their distinctness of outline renders them capable of being easily arranged under two principal heads, each of which will admit of being advantageously sub-divided; an arrangement which appears to me to be of practical importance, and necessary indeed, in order to present this part of the subject in a tolerably clear light.

Taking the character of the symptoms alone for the foundation of the principal division, one is naturally led to apply the term *congestive*, to one class of cases, and that of *inflammatory* to another; under which the whole number may be included,—the former comprising a little more than one half. The distinguishing features of these classes, if I may so call them, which are very accurately represented by their names, were always well marked at the beginning, and generally also through the course of the attack, even when most protracted. The exceptions to this latter remark were found in but a small number, in some of which, for example, the disease, inflammatory in its aspect at the beginning, assumed, after a first remission, a stage of congestion more or less decided in its symptoms; or, as in others, the first stage of congestion, after an uncertain time, gave way before a reaction, which might continue to characterize the attack in its further progress; or, might be succeeded after another uncertain interval, by a more or less obvious return to the congestive state. The latter, however, can hardly be called exceptions with strict propriety, for the stage of reaction in them, no matter how violent it might prove to be afterwards, was at first a state of improvement—a remission in fact differing from other remissions presently to be noticed, only when the secondary state proved to be permanent. With these few exceptions then, the stamp put upon the character of the attack, as concerns these classes, was neither effaced, nor indeed hardly obscured in its progress or march.

It is next to be observed that among the individuals of each class there were many well defined shades of difference which require to be fully set forth in a true pic-

ture of the epidemic, and which will afford the foundation for the further division or sub-division spoken of. These differences were of two kinds: The first depending chiefly on different degrees of violence, may be represented in three groups, the general features of which may be properly expressed by the terms *malignant*, *grave* and *mild*; the middle term being applicable to the inflammatory class only. The second kind occurring among cases of equal violence, cannot be expressed in general terms, but may be represented to some extent in a selection of cases from the several groups. It will be found that this sub-division is, in point of fact, much less arbitrary than the terms would generally imply.—The several varieties were not disposed to run into each other by imperceptible shades, so as ever to leave a doubt as to the place to which certain cases might belong,—on the contrary, they preserved a distinctness and uniformity of outline, which could not have been anticipated from different shades of violence merely, in the same epidemic disease; nor were the individuals of one group disposed to change abruptly to that of another.—I have not been able to find, neither among my own notes, nor among those furnished me by other physicians, more than a single instance in which an individual of one of the sub-divisions, viz: the *grave*, assumed, in its progress, the symptoms of another, viz: the *malignant*. Thus, the first impress of the power of the disease giving rise to this sub-division, was not less a lasting one, than was that on which the higher division was founded; and whatever deviations from it might have been observed, were comprised within limits which fairly justify, as an expression of uniform and stable differences, the application of the comparative terms I have employed to designate them.

I now proceed to consider the two classes and their sub-varieties separately.

1st. *Of the congestive class.*—As I have already intimated, there were but two divisions of this class, viz: the *malignant*, and the *mild*. Their affinity to each other was manifested by such symptoms as distinguished this from the inflammatory class, viz: the constant pres-

ence of a cool skin, a small and feeble pulse, and a characteristic tongue, which corresponded, in appearance, with that first described at page —. The traits which distinguished them from each other were not less obvious and uniform.

2d. *The malignant* was distinguished by the frequent occurrence of chilliness in the forming stage; a great diminution or prostration of strength; the invariable occurrence, at some period of the attack, for the most part on the first day, of coma, or at least a great degree of stupor, which was more common than delirium;—of delirium, or of both; embarrassment in the movements of other muscles than those of the neck, and the stronger contraction of some of the former, drawing the occiput downwards; a wider range in the frequency of the pulse, and its more changeable character otherwise; the greater quantity and viscosity of the saliva, and thicker coating of the tongue; and by an occasional tendency to assume the symptoms of the inflammatory.

Case 1. Moody, white, aged 20, Printer, was taken with a slight chill on the 13th of March, 1848, at 5½ P. M., and had some fever during the night, and rested badly. On the next day, at 11 A. M., he was seen by Dr. Sims. He then had the following symptoms: comatose; skin cool and dry all over; face pale; hands and feet cold; pulse 76 to 80, small, very feeble and irregular; resp. 32; pupils natural, and move readily to the light; conjunctivæ injected; lies with his mouth open when quiet, but is very restless; flexure of the hand on the fore arm, and of the latter on the arm; great sensitiveness of the skin of the arms to the touch or pressure; pressure on the cervical vertebræ caused great distress, and increased restlessness, during which he made strenuous efforts to get out of bed, turning his eyes wildly; it was now ascertained that he was amaurotic; does not speak. He remained pretty much in this condition during the day, his pulse continuing feeble, but variable, ranging from 62 to 96. Towards evening his skin had nearly the normal temperature, and had become moist, but again become cool, and his feet very cold before 9 P. M., about which time he had a large evacuation of urine.—

On the 17th, his bowels had been opened freely by Croton Oil, and a blister which had been applied to the spine had filled well; his pulse had become very frequent, 138 to the minute, with rather more feebleness and diminution of volume; the amaurosis had disappeared with the tonic contraction of the muscles of the arm; during the day he was restless, and disposed to get out of bed, which he did frequently; then he would go to the fire and sit awhile, then to the pail and drink water, return to bed, respread the covering with some care, and lie down; while this was going on he carried his head bent backwards with the chin elevated; did not speak, but groaned a great deal in a way that indicated a general uneasiness and distress, rather than pain. At night it was evident that he was failing fast, he continued restless, but now kept his bed; his eyes had become more injected; his pulse still quicker and more feeble; and the expression of his countenance, which had before been rather stupid, was wild; when importuned to speak he merely ejaculated, "Oh Lord!" He died without convulsions about 9, A. M.

Case 2. Black, age 22, called at the office of Dr. Jones early on the morning of the 8th of March. He had been treated during the past summer for a quotidian intermittent cephalalgia, which proved to be very obstinate, but yielded, at last, to a salivation. He now complained of a similar intermittent pain which came on early in the morning, increased in severity until 12, M., and then gradually declined until night, when it went off. The paroxysm for which he consulted Dr. J. was the third,—along with it he had tenderness of the cervical vertebræ. He was directed to have a blister put on the spine over the cervical and upper dorsal vertebræ, and to take half a grain of valerinate of zinc, with extract of hyoscyamus, every four hours. On the 9th I saw him, in the absence of Dr. Jones, at 8, A. M.; he was then very stupid, but could be roused to answer questions in monosyllables without much difficulty; he was lying on his right side, and would not keep any other position; his skin was moist and cool on the head and body, and cold and dry on his feet and hands; coun-

tenance dull, as if from sleepiness rather than coma; pulse 84, small, feeble, and irregular; conjunctiva not injected; pupils natural; when questioned said he had pain in his head. At 9, A. M., Dr. Jones took charge of him, and from him I have obtained the following additional history. At this time his pulse had increased in frequency, without any other change in it, and he had become more stupid. He took a cathartic, and had mustard cataplasms to his extremities. At 12, M., his bowels had been acted on twice; his skin was becoming dry, without getting warmer, and the pulse was even more feeble. At 4, P. M., his pulse had risen to 112, and having a little increased fullness, he was bled from the arm to thirty-two ounces, after which the pulse became again exceedingly weak, and rose in number to 125. He was then directed to have six grains of ferrocyanide of quinine with Sp. lavend. comp. every four hours. At 9, A. M., his pulse was 160, his skin moist, and the coma profound.

On the 10th, at 8, A. M., he had taken twenty-four grains of quinine; pulse 132, other symptoms not at all improved. At 11, A. M., he was taken with convulsions in paroxysms which lasted about a minute, and recurred at intervals of about ten minutes—these continuing, he died about 3, P. M.

Case 3. Dennis, black, aged about 30, Ferryman, was taken with a bad cold and cough on the 21st of February; along with the cough he had also a sore throat, and some stiffness and soreness on motion in his neck; he continued at his work until the 24th, at 4 o'clock, when he took a chill and came home to bed; rested badly during the night; had great thirst, and complained of slight pain in the head, and severe pain in all his joints. On the 26th, at 10, A. M., he was in the following condition—the history of the case from this time being taken from the notes of Dr. McLester:—Free from delirium and coma, eyes injected; pupils, skin, and respiration natural; tongue covered with a thick whitish coat; nausea, and occasional vomiting of a greenish water; bowels open; pulse 62, small and irregular; urine highly colored; has severe pain in the region of

the frontal sinuses, which is increased by light pressure over them; pain, also, in the occiput, and back of the neck, but not violent; some increase of pain on pressing the cervical spine; soreness in the muscles of the neck; movements of the head and arms embarrassed; discharges from his nose, with difficulty, a thick bloody muco-purulent matter. He was ordered to take sulphate of quinine, morphine, and ext. of hyoscyamus, every four hours, and to have a sinapism to the neck, which, at 8, P. M., had relieved the pain in the head and neck, to a great degree. On the 27th, at 8, A. M., the pain in the head, which was relieved during the night, had returned; the movements of the head were more embarrassed; and those of the arms were tremulous; in other respects the symptoms were the same. In the evening he had some difficulty in deglutition, and in getting rid of the matter in his nose; in the course of the night he became delirious, for the first time, and continued restless until the morning of the 28th, when he had become perfectly rational, and was almost free from pain in the head, the little remaining being in the region of the frontal sinuses. From this time his condition changed but little until late in the afternoon of the 29th—he was kept, during this time, quiet, with an occasional dose of morphine, and had colomel, in doses of five grains, given to produce ptyalism; in the afternoon of the 29th, he was evidently sinking, and at 7, P. M., he died quietly, having had no delirium, and conversing sensibly of his approaching death, almost to the last moment.

Case 4. Rose, black, female, aged 20, having complained for a short time of pain in the head, neck, and shoulders, was observed to totter, and show an inclination to fall backwards while at work in the field on the 18th of April. Soon afterwards she got separated from the other hands, and was found lying on the ground insensible;—this was about 12, M. At 5, P. M., when she was seen by Dr. Holt, she was in a profound coma, pulse 72, small, and very compressible; skin cool, generally, and cold on the extremities; eyes natural; *muscles of the extremities cataleptic*. She was directed to take a drachm of calomel, and to have a blister on the

spine, to cover the whole of the cervical and dorsal vertebræ. On the 19th, at 9, A. M., the symptoms had not changed, in any respect; two scruples of calomel were given at this time. At 5, P. M., the stupor had subsided, and she then complained of pain in the head, and soreness and stiffness of the neck. She was directed to have an enema, and take ten grains of calomel every three hours. On the 20th, she had become salivated, her skin warm, and pulse fuller, 110. From this time she continued to improve, and was discharged on the 23d, the salivation having become very profuse.

Case 5, (from Dr. Berney's notes.) Cornelius, blacksmith, 30 years old, of sound constitution and regular habits, complained for the first time on the morning of the 17th of March, of head-ache over the entire frontal region, which caused him to quit work. The pain not having diminished at 7 o'clock, P. M., I (Dr. B.) was requested to visit him. He now complains, as during the day, of pain in the forehead, but is free from pain or uneasiness in every part of the spine; his skin cool; tongue clean; pulse natural in frequency, but feeble; pupils natural; no thirst; bowels constipated.

12th, 11, A. M. He was moved this morning, early, at his own urgent request, to his master's, four miles from town. Temperature of the surface rather below natural; hands and feet cooler than the rest of the body; pulse 96, small, feeble, and very compressible; delirium; excessive pain in the head and lumbar region; strong contraction of the flexor muscles of the left forearm; extreme restlessness, rolling and tossing in bed, exclaiming, "I shall die;" pupils natural; tongue clean; (this is a single exception to a rule which was otherwise uniform) no thirst; sensibility unembarrassed, as, also, muscular motion, except in the left arm: R. V. S. to thirty-eight ounces, blisters to neck, arms, thighs, and legs, hot turpentine rubbed on extremities, calomel gr. *xl.* At 4, P. M., he was bled again to ten ounces, and again to the same extent during the night.

13th. The blood drawn on yesterday exhibits a soft coagulum, not buffed, and but little serum; pulse 94, still small and feeble; some tendency to stupor; the

contraction of the arm having ceased entirely, there is now no embarrassment in the functions of any of the motor or sensitive nerves—R. Cal. and ext. colocynth comp., each five grains, to be given every two hours; blisters over Ossa Parietalia.

14th. Tranquil, head free from pain; slight pain in the back; pulse 112, feeble and small; skin natural in temperature; herpetic eruption on the lips; asks for food, and says he is hungry; ptyalism suspected.

15th. Ptyalism evident; has been restless during the night from strangury, which is still very troublesome; is very loquacious. In the afternoon he was observed to pick at the bed clothes; pulse 112, a little fuller and stronger.

21st. But little change since the 15th, until to-day. He has been troubled a great deal with strangury, and has had, along with it, rigid contraction of the recti muscles of the abdomen. He has been free from delirium, and nearly so from pain, the pulse varying from 100 to 120; to-day he is stupid, and greatly prostrated—these increasing, he died on the 22d, without convulsions.

The two following may be called mixed cases, as pertaining to both of the malignant groups, having, at the beginning, those pertaining to the congestive.

Case 6. Miss B., a young lady, just returned from boarding school, in excellent health, aged about 16, of a lymphatic temperament, had some degree of chilliness, about midnight, on the 16th March, which was followed by fever, and pain in the head. On the morning of the 17th, the fever and pain continued; at 4, P. M., she had some feverish heat about the skin; her eyes were somewhat injected; her tongue was coated all over the dorsum; and her pulse 118 beats to the minute, and nearly natural in fullness and force; she had no pain in the head when still, but complained of pain in the forehead when it was raised from the pillow; in about half an hour she vomited once, but made no complaint of sick stomach afterwards; at 9, P. M., she had a return of head-ache, and was somewhat restless until 11½, P. M., when she expressed a wish to get up, in doing which she was assisted by her father; but she had no sooner

gained a sitting posture than she began to talk rapidly and incoherently; her articulation becoming indistinct, she very soon fell into a comatose state, and had a large involuntary evacuation from her bowels, in bed. I saw her in half an hour afterwards, at which time she was comatose, but restless and moaning; her skin pale, cool, and dry; pulse about 70 beats to the minute, was small, soft, and irregular in the time and force of its beats. In a very short time the coma became profound and the breathing slow, and a little stertorous. She was now still, and insensible to any kind of stimulant; the right pupil was steadfastly dilated, so as to leave but a very narrow rim of the iris visible; the left pupil was dilated, but moved spontaneously, both being insensible to light. She was bled from the arm to twenty ounces; the blood was not buffed; before it had ceased running the left pupil moved to the light of a candle, to a limited extent; at the same time a free sweat broke out, which was particularly cold on her forehead; she got restless, and her pulse quickened. After these symptoms had subsided, which required half an hour or more, six ounces more of blood were taken from the back part of the neck by cups, and, sometime afterwards, eight ounces more from the arm, each of the last bleedings producing a recurrence of the symptoms which followed the first; after the last one her pulse rose to 104; in the meantime, mustard had been applied to her extremities; hot applications had been made to various parts of her body, and her head had been shaved, and a blister had been applied, so as to cover a part of the frontal, and nearly the whole of the parietal bones. For several hours afterwards the left pupil became more and more moveable, and the right contracted gradually, being still insensible to light. At 10, A. M., on the 18th, both pupils, though dilated, responded to the light, but not perfectly, and their motion was not consentaneous; when asleep both pupils were contracted, but not equally, and when awake they were unequally dilated, and the dilatation was invariably increased when she made any muscular effort. At this time the skin on the head and body had become warm, while her feet and hands were still cool,

and her face very pale ; her pulse was 108, small and soft ; she was more sensible, spoke when importuned, and articulated well ; drank water when it was put to her lips, and pressed the glass towards her mouth ; it was now ascertained that the right eye lid was partially paralytic. At 7, P. M., she had recovered entirely from the coma ; her skin had become warm all over, and she was free from pain of any kind. On the 19th, at 6, A. M., I was told that she had passed a very restless night, had vomited several times, and had had a frequent desire to evacuate her bowels ; her pulse was now 76, small, soft and laboring ; she complained of her head, and had a cool and dry skin. One hour afterwards, without any medicine having been given, all these symptoms had changed ; her pulse was full, strong, firm, and 130 to the minute ; her face flushed, and skin warm ; had no pain ; spoke cheerfully, and jested with a younger sister when she came to the bedside. This state of improvement continued throughout the day, her pulse falling, in the evening, to 104. At 12½, A. M., of the 20th, I was called to see her, and found that half an hour before she had been taken, suddenly, with a very acute throbbing, and lancinating pain, which occupied, at times, the whole of her head ; her pulse was 120, full, steady, and firm ; face flushed ; lips deeply colored ; frequent desire to go to stool ; nausea, and, at times, vomiting ; no delirium, nor coma ; about five ounces of blood having been taken from her neck, by cups, she complained of feeling faint, and asked for colonge ; at the same time her face and lips turned pale, and her pulse became very feeble. Her head not being at all relieved, two cups more were applied, drawing not more than an oz. and a half of blood, when the symptoms of approaching syncope appeared again, without the slightest relief, but rather an aggravation of the cephalalgia. As the morning advanced the pain increased in violence, so that she frequently cried out with it. She became a little delirious towards 5 o'clock, A. M., asking irrelevant questions, and replying to imaginary ones. She now took one fourth of a grain of morphine, and at 8, A. M., was sleeping quietly ; pulse 80, full, irregular and hard ;

face flushed; skin hot and moist; no pain in the head; and though she talks when asleep, is free from delirium when awake; she asked for ice, which was allowed her. At 3, P. M., I received a note from her father to the effect that she had become very talkative and restless, and that her face had become more flushed; at 3½, P. M., I found her comatose, breathing slowly and stertorously; pulse 70, full, and irregular; tongue much enlarged, and protruding from between the teeth; the mouth overflowing with saliva; face red; lips purple; she could be roused with some difficulty, and gave short answers, correctly, though her articulation was greatly impeded; she complained of being numb, all over.—Blood was again drawn, but without effect; the coma deepening rapidly, she died, asphyxiated, at 5½, P. M., her heart having continued to beat nearly two minutes after she had ceased to breathe.

Case 7. B. P., black, male, aged 46, went to bed as well as usual on the night of the 1st of March, and was found, at day-light, lying with his feet on the door-sill, and his head and body on the ground, snoring and insensible. Half an hour later he had the following symptoms: feet and hands cold; body and head cool; pulse small and soft, and varying from 30 to 60 beats in the minute; eye-lids closed; respiration slow, irregular, suspirous, and from 10 to 15 in the minute; occasional tetanic rigidity of the muscles of the back and extremities, very slight, and lasting but a few seconds at a time; skin absolutely insensible to any ordinary stimulant; eye lids motionless, when touched with a straw, and also when the conjunctiva was irritated; pupils not affected by light; contracted, but moving spontaneously; deglutition difficult; occasional attempts to vomit; succeeded twice in throwing up some yellow fluid. At 1½ o'clock, P. M., he had a strong convulsion, his pulse having previously risen to 96, and became full and firm, while his skin had attained more than the normal heat all over, and the reflex sensibility had been restored to the eyelids and conjunctiva. The convulsions recurring at short intervals, he died at 6½ o'clock, P. M.

Second. *The mild congestive form* was distinguished

from the former by the preservation of a good degree of strength, no matter how protracted the attack; the continued slowness of the pulse, which never fell below forty-six, nor rose above ninety, and its greater regularity in other respects; by the greater violence of the cephalalgia, and more frequent tenderness of the cervical vertebræ; and negatively, by the uniform absence of any cold stage, of coma, of delirium, of any nausea or vomiting, and of any embarrassment in the movements of other muscles than those of the neck.

Case 8. C. G., mulatto, male, aged 26, Carpenter, had had head-ache for several days, with an occasional cessation of an hour or so, but kept at work until the 22d of March, when he was obliged to quit on account of general weakness, with giddiness and dimness of vision. At 3½, P. M., he presented the following symptoms:—surface of body and head moist, and hands and feet cold; pupils natural; countenance dull; tongue moist, large, and indented by the teeth, coated with a thick pasty looking ash colored coat on the posterior three-fourths of its surface, and having an epithelium-like termination anteriorly; some pain in the back of the head, and giddiness when sitting up, and sometimes, also, when lying down; pulse 56, soft, and small; resp. 26. With these symptoms, which, it is perceived, differ from the malignant cases, of this variety, in little else than the absence of coma and delirium, and abnormal muscular contractions; the patient retained a good deal of strength, so as to be able to sit while being bled. He was bled to xxiv oz., after which his pulse rose to 60, but was not otherwise changed. He then had a blister applied to his neck and back, and took a cathartic. On the next day his pulse was nearly in the same state, but his skin had become warm and dry; his head free from pain and giddiness, and he was discharged on the 24th without further treatment.

Case 9. Henry, mulatto, male, aged 33 years, Barber, having had head-ache, the day before which remitted in the night, complained, on the 17th of March, of a general feeling of heaviness in his head, and of fixed pain in the occiput, and also in the back of the neck, where

there was some stiffness and soreness on motion ; his countenance, at this time, was anxious, and he expressed apprehensions in regard to his condition ; he was sitting up in his shop when I visited him, and had but recently been at his work. At this time his pulse was 70, small and very feeble ; his skin, dry and cool elsewhere, was positively cold on his feet and hands ; his tongue was broad, white and flabby, moist, and indented by the teeth. There was tenderness of all the cervical and two-thirds of the dorsal vertebræ ; pressure on the latter produced a sharp pain, darting forward from the part pressed on to the sternum. He had a blister to his neck and back, and took an active cathartic. On the next day he was greatly better, and was discharged on the 19th.

II. *Of the Inflammatory class.*—In this class there is an intermediate group, viz:—the *grave*, between the malignant and the *mild*. The affinity to each other of the individuals of these three groups was manifested by the symptoms which distinguish this from the congestive class, viz: the uniform presence of a temperature of the skin above that of health ; a full, and generally a firm pulse, and a characteristic tongue, which corresponded with the second kind described at page —. The traits by which they were distinguished from each other are placed under the several heads, as follows :

First. The *Malignant*, was marked by the early occurrence of delirium, or of coma, the former being the more common ; a great irregularity of the pulse ; the abnormal contraction of other large muscles than those of the neck, either tonic or convulsive ; strabismus ; and the occasional occurrence of amaurosis ; a tendency to nausea and vomiting, and a tendency to a speedy and fatal termination.

Case 10. (From Dr. Pollard's notes.) F. K. M., white male, aged 23, Printer, had a paroxysm of acute pain in the lower part of the back, on the evening of the 18th of March, and another of very great severity, twenty-four hours afterwards ; was pretty well on the 20th, until near night, when he had a distinct chill, accompanied with pain in the region of the lower dorsal and

lumbar vertebræ, extending into the groin, lancinating, and of great severity, but without pain in the head. After some reaction had taken place, he was bled nearly to syncope, with only slight relief. On the 21st, at 7, A. M., his skin was hot and dry; pulse 104, full and tense; tongue moist, thickly coated on the posterior two-thirds, and red on the tip and edges; pain in the back only on motion; general soreness of the muscles; face flushed; eyes brilliant, pupils dilated. He remained in this condition, without delirium or pain in the head, until 11½ o'clock, P. M., when he was found much worse; he had become wildly delirious, was complaining of great pain in the head, tossing about the bed, pulling at his hair, and, at times, retching violently, bringing up only a little white froth; pulse 84. After losing fourteen ounces of blood, he became quiet, and continued so during the night, being rather comatose. On the 22d the coma had increased; when roused he was delirious; in the course of this day his tongue became dry, and the coating was coming off. At 3½, P. M., he was again bled, to fourteen ounces, immediately after which his pulse, which, just before, was 104, rose to 120, and became smaller; the coma was not at all diminished by the bleeding; sometime after it he passed urine involuntarily. On the 23d, it was found that he had spent a quiet night, sleeping well, was free from coma, and nearly so from delirium; said his head felt better, (he had not complained of it for twenty-four hours,) but gave him some pain; pulse 100, full and soft; his tongue, however, was red and dry, and black sordes were gathering on his teeth, and he complained of great soreness all over. On the 25th, having been freed from pain in the head and delirium since the 23d, he complained of pain in his head again, the skin of which was hot; and he was inclined to wander in his speech, and his tongue continued to be dry and red. A pitcher full of cold water having been poured on his head, the pain and delirium disappeared, and his pulse fell from 84 to 76, and became softer. After remaining in this improved condition, but without improving for several days, he began to get better, but so slowly that he was not discharged for several weeks.

Case 11. (From Dr. Holt's notes.) J. H., white male, aged 12 years, was attacked without premonition, on the morning of the 21st of April, with chilliness and pain in the forehead. In the course of two hours after, the chilliness had subsided; the pain in his head was violent, of a throbbing kind; his skin was hot and dry; face flushed and frowning; tongue coated white on the posterior two-thirds, and the tip and edges of a bright pink color; pupils natural; pulse 108, full, soft and irregular. On the next day (22d,) I learned that he had had delirium through the night, and was restless, and moaned a good deal. At 8 o'clock, A. M., the delirium had subsided, but had left him entirely blind, so that he could not discover the sun light, which shone on his eyes through the window. At the same time he was free from stupor, and answered questions even cheerfully; his pulse 120, full and soft; the pupils were dilated generally, but contracted, at times, spontaneously. About 12, M., he fell into a semi-comatose state, his pulse fell to 80, and was very irregular in force, and in the time between the beats; he had, also, strabismus, and spasmodic flexure of the fore-arms and hands. He complained, now, bitterly, when pressure was made on any part of the cervical vertebræ, or on the three or four first dorsal, saying that the former produced pain in his head and neck, and the latter in the belly. He was bled from the arm, which took the flush out of his face and quickened his pulse to 120; the blood was not buffed. At 4, P. M., all these bad symptoms had subsided, including the amaurosis, and he remained tranquil and rational through the night. On the 23d, the febrile symptoms again increased, threatening a return of coma; he was again bled; the blood not buffed or cupped, after which his pulse, which, previously, was 120, rose very soon to 150. Little or no change occurred during the day; in the night he became wild with delirium, which subsided towards morning, to a milder state, but accompanied, still, with great restlessness. At 8, A. M., on the 24th, this state continued; the pupils were dilated; the vision imperfect, and the strabismus had returned; pulse 138.—After eight ounces of blood were drawn from the tem-

poral artery, the strabismus went off, but his pulse rose to 160. From this time he gradually sunk, without coma or convulsions, and with but little delirium, until 7, P. M., when he died.

Case 12. J. H., white male, aged 14 years, was taken sick some time towards morning, on the night of the 18th of April, complaining of pain in the head. On the 19th, at 9, A. M., he was seen by Dr. Holt. He had, then, violent pain in the head, neck, back, and legs; skin hot and dry; face flushed; eyes red; pupils natural; countenance anxious; tongue coated white, on the posterior two-thirds, and bright pink on the edges and tip; pulse 100, full and firm, but not hard; no delirium, nor coma; lies on his left side chiefly; bowels constipated. He was directed to have a blister along the spinal column, from the head nearly to the lumbar vertebræ; hot pediluvium and sinapisms to his legs, and to take twenty grains of calomel, which was immediately thrown up with the contents of the stomach, but was repeated and retained. At 5, P. M., he had become delirious, and very restless, with jactitation; he now took another scruple of calomel, and was directed to have ten grains every three hours, until half a drachm was given. On the 20th, at 9, A. M., the delirium, which had continued through the night, was increased; his extremities had become cool, while his body and head continued hot and dry. During the night he had several large green evacuations, from the operation of the calomel, which had ceased to operate for some hours. At 5, P. M., he was furiously delirious. After this he soon took convulsions, and died in the night.

Secondly. The *grave* was distinguished from the former by the regularity of the pulse, which was never below one hundred in the minute, except during a remission; by the morbid contraction of the muscles being confined to those of the neck, and sometimes to the sterno-mastoid of one, or both sides, alone; by the occasional occurrence of a painful sensibility of the skin to the touch, and of the retina to light; the occurrence of regular remissions, and the absence, uniformly, of coma, and of delirium.

Case 13. J. T., black male, aged 12 years, having had head-ache, with red and suffused eyes, from early in the morning of the 25th of March, was taken with a chill, at 4 o'clock, in the afternoon, which was soon followed by fever. He was seen, soon after the febrile exacerbation begun, by Dr. McLester, who bled him from the arm to ten ounces, when he got sick at the stomach and vomited, and his pulse, which had been 120, fell to 104. His pulse, at this time, was full and firm; his skin hot and dry; his tongue was coated with a brownish fur, red on the tip and edges, and rather sharp; his head-ache was not relieved by the bleeding. At 3, A. M., on the 26th, he had become lethargic, rather than stupid; when awake, he complained of his head aching all over, but particularly in the frontal region; the pupils were somewhat dilated, and the conjunctiva injected; the skin hot and dry, and the pulse firm and regular. He was bled to 14 oz., but without any perceptible relief to the head-ache, though his pulse was reduced in force.— At 8, A. M., the febrile symptoms had, in a great measure, subsided, and along with them, the head-ache, which was only felt when he raised his head from the pillow; then it throbbed painfully; he was ordered to take quinine, in doses of five grains, made into pills with mass. hydrg., every two hours. At 1, P. M., he had a return of fever without any chill having preceded from it, and with it the cephalalgia returned with increased violence, being throbbing and lancinating; pulse 124, full, and strong; skin dry and hot; resp. 28; slight strabismus when looking intently; sleeping when not complaining of his head. Bled to 16 ounces, after which his pulse became softer, and fell to 118. 10, P. M., remission of fever; pulse smaller and softer, 110; no pain nor drowsiness; talks freely; has no recollection of having seen me to-day, nor last night, nor of being bled. At 7, A. M., next day, he was free from pain; pulse 104. At 5, P. M., he was found with fever again; pulse 128; darting pain in the right eye, cheeks, and gums; free discharge of saliva; discharge of thick mucus from the nose; sense of smell confined to one nostril; no head-ache, nor drowsiness. This paroxysm declined early in

the night, and, on the 28th, he was nearly free from fever, and had some appetite. On the next day he had continued to improve, and was discharged convalescent.

Case 14. G. O., female, aged 9 years, clear white skin, large light blue eyes, and light curling hair, delicately formed and nurtured, who had complained, occasionally, for several days, of pain in the back and soreness in her legs, when playing, was taken with a slight chilliness, which was followed by fever, at 1, A. M., on the night of the 20th March. At 9, A. M., has fever; pulse 120, sharp and jerking, but not hard; skin hot and dry; eyes pinkish and watery; tongue coated brown on the posterior two-thirds, and pink at the tip and edges; intense pain in the forehead and eyes, alternately; pain frequently lancinating; excessive intolerance of light; soreness and stiffness in the sterno-mastoid muscle, on both sides, and soreness in the muscles of the arms and legs. This state continued until the next morning (21st) when there was a considerable remission of all of the symptoms, except the pain in the head, and the intolerance of light, neither of which were much mitigated.—On the 22d, she was still improving, and continued comfortable until 10 o'clock, P. M., when the febrile symptoms returned, as I was told, with an aggravation of pain, &c. On the 23d, at 8, A. M., her pulse was 124, full and sharp; intolerance of light, and intense head-ache; painful sensibility of the skin, so much so that, at times, she could not bear to be touched; when her head was raised she complained very much; on one occasion she said, “you are dragging my head to pieces.” She was now directed to take carb. potass, in solution, four grains every two hours, and to have a blister to the neck. At 12, M., all these bad symptoms had disappeared—the pulse had fallen to 84, the skin cool and moist; the face, which had all along been flushed, was now pale; she had neither pain in the head, nor soreness in the skin or muscles, and was cheerful. The carb. of potass was now suspended, and two grains of quinine ordered in its place, every two hours. On the 24th, at 9, A. M., I learned that the fever had come on early in the night, and had continued, without any remission; her cheeks were

again flushed, and the pain in the head, intolerance of light, and sensibility of the surface had returned. The quinine was now suspended, and the carb. potass ordered to be given as before. At 1, P. M., the symptoms of head disease had again disappeared, and there was a very great remission of fever, and this state of improvement continued, with but little interruption, until the 27th, when she was discharged convalescent.

Thirdly. *Mild Inflammatory*. The individuals of this group were distinguished from either of the preceding, by the lower grade of the febrile excitement; the preservation of a good degree of strength, no matter how long the attack might be continued; a tendency to take on a chronic form: and, negatively, by the absence of coma, drowsiness, delirium, and of a cold stage.

Case 15. Nat, black male, aged 18 years, drayman, had had head-ache for a week, when he came to my office on the 21st of March, having continued at work until the 20th. He has now fullness and pain all over his head, but particularly in the occipital regions; his skin has a feverish heat and dryness; his pulse is 80, and full; his tongue has a white coat on it, and red edges, not enlarged. He was bled, sitting, to xxxii oz., when he became faint, and his pulse got small and quick, while his skin remained dry. After lying down a few minutes he got up, and again became very faint, and his pulse slow and soft; the dryness of the skin persisting; blood not buffed; the coagulum very large, and firmer than usual in this disease. He had a blister to his neck, and took a cathartic dose of calomel and rhubarb, was directed to take some quinine, and return next day. On the 22d, he was without head-ache, but had a very troublesome sense of fullness in the head, and shrunk from a very slight pressure at the junction of the occiput with the spine; pulse full and firmer, 104. He was ordered to take a pill composed of five grains of mass. hydrg., and one fourth of a grain of tart. ant. every four hours. On the 23d his gums became sore, and on the 24th he was discharged.

Case 16. Solomon, aged 32, black, stout and healthy, had pain in the head and loss of appetite on the 23rd of

March, which continued through the night. He went to work on the 24th, but the pain becoming aggravated he desisted and went home, where he was visited by Dr. McLester, at 12½ o'clock, P. M. He had, then, acute pain in the frontal and occipital regions, and in the neck and back, which was aggravated by pressure on all the cervical, and on the dorsal vertebræ as far down as the sixth; eyes injected; tongue covered with a thin white coat; some nausea; bowels constipated; pulse 90, regular and tolerably full and strong; skin warm and dry; he was bled to xxxii oz., and had a blister along the upper half of the spinal column, and took a dose of calomel, with tartar emetic; he became very faint from the bleeding, and vomited. At 2½, P. M., the head not having been at all relieved, he was bled from the arm to xvi oz. more, which brought on syncope, with vomiting, cramp in the fingers, and temporary delirium. At 6, P. M., he still had pain in his head, when raising himself in the bed, and also in the back. On the 25th, at 8, A. M., it was found that he had rested very well during the night; was free from pain and fever; pulse 65, and strong. On the 26th he was convalescent, but had forgotten nearly all that had passed during his sickness, and had no conception of the length of time since he was taken.

In other cases of the mild varieties the disease was more protracted, lasting, sometimes, ten days, or two, or even three weeks, the patients all the time being able to sit up and walk about a little. In one instance, a man came to my office, having had pain in his head, stiffness in the muscles of his neck, double vision, and dimness of sight for several days—symptoms which required large bleedings and a salivation to remove.

Sometime the effects of the mild cases, when apparent recovery took place within two or three days, were experienced for weeks, in the form of confusion of the mind; a feeling of tightness across the forehead, or about the base of the brain, from one temporal bone to the other; or pain in the occiput, or neck, upon any unusual mental occupation. Upon one occasion, a very mild attack, in a man about thirty years old, who was

dismissed as cured on the second or third day, was followed by great imbecility of mind and weakness of body, which continued for some weeks. It was remarkable, as I have before said, that no matter how long continued these mild cases might be, if they began with the cool skin, and feeble and slow pulse of the congestive form, so they continued to the end, or until convalescence was begun; and so, also, of those which assumed the inflammatory form.

Remissions.—I have selected the preceding cases, for the purpose of illustrating the general features of the several groups into which I have gathered the innumerable varieties which the disease assumed, without reference to an important feature which, though frequently unobserved, occurred in a great number of cases belonging to each division, viz: a tendency to remission, which was manifested very irregularly at some period of the attack, varying from a few hours to several days from its onset; but occurring most frequently on the second and third days—days on which, also, the greater proportion of deaths occurred. These remissions were sometimes very great, approaching very nearly to intermissions; at others they were obscure, and there were various degrees of amelioration of the symptoms between these extremes. They were irregular, also, in other respects—sometimes they were quotidian or tertian, and accompanied by remissions of fever, so as to make it appear as if the meningitis were engrafted, as it were, on an ordinary endemic fever. In other cases, a remission of the cerebral symptoms took place without any very obvious change in the febrile state; and in others, again, the febrile symptoms remitted, or, it might be, intermitted, leaving those of the head disease unmitigated. In all these cases, though the hours of their return might be uncertain, the changes were so evidently remissions merely, that there was but little difficulty in identifying them as such, so that future changes could, to a great extent, be anticipated; but there were others which, from their great obscurity in this respect, and from their more frequent connection with the malignant forms of the disease, were much more important, in a

practical point of view, as they were apt to lead to a premature suspension of treatment. In such cases as I now refer to, after an uncertain time, it might be not more than twelve hours, or it might be four or five days, or any intermediate period, but commonly on the second or third day, there would take place a change, sometimes so decidedly favorable as to lead to the belief that convalescence was established, or, at least, about to become so; the pulse and skin might approach very nearly to the condition of health, though some irregularity or abnormal sharpness or frequency might always be detected in the former (a fact of great importance); the mind sound, and even cheerful; the head free from pain, and the muscles from abnormal contractions, and this state of things might end in a rapid recovery. It was very seldom, however, that the promise was so kept, if the preceding stage had lasted more than twenty-four hours; such remissions, or pauses, in the march of the disease, being generally followed after an interval, the length of which could never be foreseen, but which might be a few hours, or days, by an exacerbation of equal severity as the first. At other times, these remissions were less decided, but still sufficiently so to feed the hopes of the patient, and frequently to delude the judgment of the physician. In a few cases, the remissions were somewhat peculiar, consisting in a change of form from the congestive to the inflammatory type; as, for example, when a state of stupor, or coma, attended with a cool skin and feeble pulse, was changed to a state of reaction, in which the stupor, or coma, went off, and the skin became warm and the pulse full and strong; the latter state always presenting features less alarming than the former.

It was in the inflammatory forms, particularly the grave varieties, that the remissions were most regular, and in which there was, consequently, the least difficulty in recognizing them as such.

Complication.—Inflammation of the fauces was observed in seven patients, five of whom had lately recovered from roseola, which was also prevailing epidemically, and two had roseola with the meningitis. The

latter was also complicated, with bronchitis in three cases, and with pneumonia in two.

The affection of the mucous surface of the intestinal canal, and of the mesenteric glands, may be placed under this head, although the existence of the former in every case in which the parts were examined, and of the latter, in four-fifths, might justify the inference that a tendency to disease in these organs, constituted an essential feature in this epidemic. This point would have been more satisfactorily determined if the abdomen had been opened in all the post mortem examinations made, and I regret very much that this was not done. My attention, however, was not drawn to this subject until the mortality had begun to abate, and the opportunity for more extended observations had gone by.

A typhoid state was assumed at a late period, in the progress of the attack, in three cases. The occurrence of this state, in other epidemics, has, I observe, been usually recognized as one of its forms, but, as it never occurred here, near the beginning of an attack, the earliest appearance of typhoid symptoms having been noticed about the tenth day, I have not been willing, notwithstanding the remarkable lesions of the agminated and mesenteric glands in other cases, to consider it as designating a form of this disease in any way connected with its essential pathology. Whether the same intestinal alterations existed in these cases, I had no means of ascertaining, as they all recovered.

Diagnosis.—The perusal of the several groups into which I have gathered the more constant phases in which the epidemic presented itself, will serve to show but partially, the exceeding obscurity and difficulty of the diagnosis, before it was suspected that an epidemic meningitis was prevailing. The individuals of each of these groups presented other varieties than those which I have given examples of, and, it unfortunately so happened, that those most widely separated were the first that appeared, and this successively. The consequence of this want of uniformity was, that the opinion of the physician had to be made up by the study of each case, almost unaided by any analogy with the symptoms of a

preceding one, and, besides this, so great was the diversity that even the post mortem examinations, which were made in every one of the first few fatal cases, threw but little light beyond the particular case examined. The first cases were, nearly all of them, of the congestive form, which, although they might present unequivocal evidences of an affection of the brain or its meninges, and even this they did not always do, the symptoms indicated, if at all, but very obscurely, its true seat and nature. To all this it must be added, that there was only that general resemblance to sporadic meningo-cerebritis as might occur in diseases differing in their nature, and, not unfrequently, even this general resemblance was wanting. Simulating, then, as the epidemic did, in the malignant varieties, in one attack, an endemic cerebro-congestive fever; in another, idiopathic apoplexy; another, abscess of the frontal sinuses, and in another, hysteria, it will be readily seen, that but little aid in the diagnosis could be obtained, either from the similarity of one of these cases to another, or to the sporadic disease in its common aspect. The symptoms of spinal inflammation, too, as may have been observed, were always obscure, without excepting those cases in which there was tenderness on pressure of the vertebral processes, for this is not held to be, ordinarily, at least, a sign of inflammation.*

I need hardly add, nor can it be a matter of surprise, that, in several instances, at the breaking out of the epidemic, the diagnosis was either erroneously made, or remained doubtful, until a post mortem examination, or a more extended observation, satisfactorily determined it. It is to be remarked, however, that such errors or doubts could only occur at the beginning of the epidemic. After several post mortem examinations, and a free interchange of opinion among the members of the Medical Society were had, and it was thus ascertained that

*These varieties were not accompanied with any corresponding varieties in the anatomical lesions which were apparent; and I was continually disappointed in searching for peculiarities in the latter to correspond with certain lesions of the intellect, of sensibility, and of the motor apparatus.

these varieties of fatal disease represented an epidemic meningitis, the difficulties were at once either fully dissipated, or sufficiently so to secure a prompt and proper treatment when a doubt existed. But even with this qualification, such errors or doubts as did occur, were of a magnitude proportionate to the fatality of the disease, for any treatment to be efficient, as was abundantly proved, had to be entered on with the utmost vigor, on the first day, and thus an error in the diagnosis was calculated, and no doubt did so occasionally, so far to modify the treatment as to suffer the precious moments to escape, when a more active medication would have been successful.

The preceding observations are chiefly intended to be applied to the malignant varieties. In the mild and grave varieties, the errors, if made, were of but little consequence, as none of the cases belonging to them proved fatal, and many were not attended with even the appearance of danger. Nevertheless, difficulties did occur, in the diagnosis of these cases, which, if they were of but little comparative consequence to the patient, were troublesome and embarrassing to the physician.—There was, necessarily, a good deal of doubt, at first, as to the nature of the cases, being comparatively so mild, whether they were, in fact, but the insidious precursors of a more malignant aspect, or were the disease in a mild form, fully developed—a difficulty, in fact, in prognosis as well as diagnosis. Whilst such doubts existed, they were frequently treated with unnecessary vigor, were watched with the utmost vigilance, and were the source of incessant anxiety. They were embarrassing in this, that on the one hand the indications in the mildest varieties, which were the most numerous, nor in the less violent of the grave, did not warrant, without better proof of present or prospective danger than any at hand, the active depletion and urgent efforts to bring about a speedy mercurialization which was thought indispensable in the malignant varieties; and, on the other, it was feared that to neglect these remedies might compromise the safety of the patient. It was not till after the epidemic had made considerable progress, that this source

of trouble was obviated by the steadiness with which each variety of the several groups run its course, without intermingling with another.

The symptoms by which the meningitis was distinguished, after some familiarity with the symptoms was obtained, were the following, viz: The cephalalgia, its seat, particularly when in the back of the head, and other peculiarities connected with the nature of the pain as differing from other head-aches. The state of the tongue, particularly its enlargement, indentation, and gummy or pasty coating, and the bright pink of its edges. The physical characters of the blood—the pain in the neck, and stiffness and soreness in the muscles—muscular tremors, and other embarrassment of motion; and traction of the occiput downwards—the state of the pulse, which was valuable as a diagnostic sign in both varieties of the congestive type, but only in the malignant varieties of the inflammatory type—delirium; rigidity of the large extensors of the spine; coma—the state of the pupil, and the injection of the conjunctivæ, which last, though not so important as the other, was more constant.

Age, sex, color.—Among eighty-five cases, sixty-four of which were taken from the register of Dr. McLester and myself, and twenty-one from all the notes furnished me by other physicians, there were, of *whites*, five years old and under, one,—over five and not exceeding ten, two,—over ten and not exceeding twenty, eight,—over twenty and not exceeding thirty, three,—over thirty and not exceeding forty, three,—over forty and not exceeding fifty, two,—over fifty, three. Of these ten were males and twelve females. Of *blacks* under five years, one,—over five and not exceeding ten, six,—over ten and not exceeding twenty, fifteen,—over twenty and not exceeding thirty, twenty-four,—over thirty and not exceeding forty, ten,—over forty and not exceeding fifty, five,—over fifty, two. Of these thirty-six were males and twenty-seven females.

Mortality—The mortality was confined to the malignant varieties. Among these, the ratio, from the best information I can get, was about sixty per cent.

Locality.—The little city of Montgomery is situated on the left bank of the Alabama river, at the extreme southern convexity of a horse-shoe shaped curvature, or bend of the river. The *bend* nearly encloses several thousand acres of alluvial land which is subjected to an annual overflow. The geological formation on which the town is built, following Mr. Lyell's division, is the eocene tertiary. At distances varying from fourteen to thirty miles north and east, the tertiary forms an abrupt junction with the primary, consisting, at various points, of mica slate, gneiss, and granite. A belt of the cretaceous formation, (prairie) running east and west, and varying in width from eight to fifteen miles, approaches within a mile of the southern and south-eastern border of the town. Beyond the prairie, towards the south, the eocene tertiary is again found. On the western limit of the town, a range of hills takes its rise rather abruptly, and running first south, then east, and then north, forms an amphitheatre, which rises, in some places, one hundred and fifty feet above the river bank, looking, from its northern aspect, on the river and the alluvial ground beyond it, and is crowned with a narrow strip of table land, beyond which, except on the eastern side, the ground again descends, for several miles, to a large creek which empties itself into the river, several miles below, or west of the town. A basin is thus formed with the hills on three sides, nearly, and the river on the other, having a sufficient inclination towards the latter to carry off the water which gathers during a rain, in rapid currents, and thus to secure, whenever a hard rain falls, a thorough cleansing of every part of the town. It is within the limits just described, and on the hills above, that the town is built; the greater part of the population residing below the range of hills. The residents on the sides of the hills, and on the level above, hardly comprise one-third of the whole population, which numbers, in all, about four thousand souls, a large part of which, the proportion not being known, are blacks.—The dwellings are built with ample space around them; there is no crowding, nor are the residents crowded within them; nor are there any accumulations of filth any

where to be found, at any season; for, besides the frequent washings in wet seasons, from rain, the yards and streets are subjected to frequent inspection by a commission which always includes at least one physician; neither is there found, within the city, any of the destitution of extreme poverty, all the inhabitants being supplied, if not by their own exertions, by the charity of others, with a sufficient supply of food and comfortable clothing—but objects of such charity are very seldom seen. The residents on the sides and top of the hills have no advantage, in any of these respects, over those occupying the less elevated parts of the town.

It was within the limits just described, bounded by the base of the hills on nearly three sides, and by the river on the other, that the epidemic was chiefly confined.—Whilst a large proportion of the residents below were attacked with the disease, there were but few cases found among the residents on the sides of the hills, and still fewer on the table land above. The statistics of Dr. McLester and myself give three cases on the hills for sixty-four below them, which is larger than a general average. From the best information I can get, there were not less than two hundred and fifty cases within the town limits, of which not more than ten occurred above the base of the hills. As, however, but few of the physicians register their cases, the former number is, in some measure, conjectural; I am certain, nevertheless, that the proportion given is not too large.

The surrounding country, which is thickly populated, was remarkably exempt, at this time, not only from the epidemic, but from all other diseases, contrasting forcibly, in both respects, with the city. After the epidemic influence had exhausted its virulence here, and had in a great measure subsided, the disease made its appearance on a large prairie plantation, belonging to Mr. Wm. Knox, lying eight miles south-east of the city, where, according to a report kindly furnished me by Dr. Holt, nineteen cases occurred, a majority of which were of the malignant congestive type. About the same time it fell upon another plantation (prairie) some three miles south of the former, stepping over an intervening one,

and leaving the latter, as, also, the other adjoining ones, as free from sickness, as at the same season in other years. After it had disappeared from these localities, it again made its appearance on the plantation of N. Harris, Esq., situated three miles west of that of Mr. Knox, where four cases occurred, all of which were of the grave inflammatory variety; and here the epidemic influence terminated. In regard to the causes which determined the attack on these plantations, to the exclusion of others, I can give no information, any more than why it fell on a part of the town of Montgomery, almost to the exclusion of another part. In regard to those of Mr. Knox and Mr. Harris, I can affirm, from personal observation, that there was nothing more apparent than in the city, which might be supposed to invite the visitation of any disease of an epidemic kind. The negro houses on both, are unusually comfortable and cleanly, and the negroes are well fed, and well clothed, and are not overworked, nor otherwise harshly treated.

General influence of the constitution of the atmosphere.—The meningitis made its appearance early in February, was most prevalent in March, and disappeared, as an epidemic, in the latter part of April. Three cases occurred after the first of May, but were divided from each other by intervals of some weeks. An epidemic *roseola* preceded and accompanied the former as long as it lasted, and disappeared along with it, and this was the case on the plantations referred to above, as well as in the city. Along with these epidemic diseases, others which are common to this climate and locality prevailed, some of them to a very unusual extent for the season. These were dysentery, diarrhœa, intermittent, and remittent fever, various forms of neuralgia, spasmodic cephalgia, catarrhal fever and bronchitis.

The following table of Meteorological observations was made by Mr. Swan, of this city, from his own records. It shows an unusually high temperature for January and February, and a very low one for March. The almost total absence of rain in January is also remarkable:

TABLE OF METEOROLOGICAL OBSERVATIONS, REDUCED TO THE WEEKLY MEAN OF BAROMETER AND THERMOMETER, FROM DECEMBER 23^d, 1847, TWENTY-EIGHT OBSERVATIONS PER WEEK, TILL MARCH 16th, 1848. TWENTY-ONE PER WEEK AFTERWARDS.

	Bar.	Th'r	N.	S.	E.	W.	NE.	SE.	NW	SW.	C'pr.	C'dy	Rain	Quantity rain fallen.		Bar.	Th'r
														24th & 25th	in. 100s		
Dec. 23 rd to 30 th	29.97	40°	4	3	1	0	7	4	3	6	17	10	1		.46		
Dec. 30 th to Jan. 6	29.99	51	1	5	0	2	2	2	10	6	15	13	0				
Jan. 6 to 13	29.94	48	1	0	0	3	1	4	10	9	13	15	9				
Jan. 13 to 20	30.03	59	5	4	3	0	1	1	3	11	11	17	0				
Jan. 20 to 27	29.94	54	7	8	5	1	1	2	1	3	13	10	5	25th & 26th	.56		
Jan. 27 to Feb. 3	29.80	53	1	3	4	2	1	4	8	5	14	10	4	27th to 2d	3.24		
Feb. 3 to 10	29.88	50	0	0	2	7	5	0	13	2	20	8	0				
Feb. 10 to 17	30.00	60	0	7	1	6	0	0	6	8	11	16	1		.13		
Feb. 17 to 24	29.81	63	0	5	1	3	3	4	5	7	15	15	7		4.32		
Feb. 24 to March 2	29.89	59	0	4	3	0	2	0	4	15	16	1	0				
March 2 to 9	29.86	49	2	3	1	5	1	3	7	6	15	10	3		1.76	Mar 6* 30.16	32°
March 9 to 16	29.98	54	1	4	0	0	4	1	6	5	18	3	0			" 8	70°
March 16 to 23	29.83	68	2	0	0	3	0	0	0	16	4	15	2		2.13	" 9	
March 23 to 30	29.85	70	2	2	0	0	0	0	1	16	14	4	3		1.02		
March 30 to Apr. 6	29.93	67	1	11	0	3	0	6	0	0	8	11	2				
April 6 to 13	29.81	63	0	0	5	0	0	3	0	13	13	7	1		2.10		
April 13 to 20	29.93	65	6	7	2	0	1	2	2	2	13	8	0				
April 20 to 27	29.91	72	2	3	1	6	1	2	4	2	10	8	3	22nd	.22		
April 27 to May 4	29.87	79	0	3	1	0	0	6	0	11	9	9	3	29th to 1st	1.11		
			35	72	30	41	30	44	83	142	240	201	35				

* Mornings of March 6th and 7th there was frost.

TREATMENT.

In what I have to say under this head, I shall refer chiefly to the grave and malignant varieties, premising, however, that the same remedies were employed in the treatment of the mild varieties, but, of course, with less activity and perseverance.

Blood-letting.—This remedy was employed, with a few exceptions only, near the beginning of the attack. It was used frequently and boldly, without regard to the state of the circulation, that is, as readily and freely in the congestive as in the inflammatory forms. The quantity taken at one bleeding, or at several in quick succession, was sometimes very great—on one occasion the quantity ascertained to have been taken at a single bleeding was forty-eight, and on another, forty-four and a half ounces.

In many other instances, bleedings equally large, or larger than these were had, but the precise quantities were not ascertained. In one case which I visited in consultation, eighty ounces were taken at several bleedings, within twenty-four hours. In a case treated by Dr. Boling, a female, fifteen years old, with the notes of which I have been furnished, there was taken, by cups, from the neck and occiput, forty-eight ounces, and from the arm twenty-six ounces, all within eighteen hours.—These are extreme quantities; in the greater number—the quantity taken altogether from adults, in one day, varied from fourteen to forty ounces—in twenty-six cases the average was found to be thirty ounces. The effects of blood-letting were not so satisfactory as might have been expected. Within my own observation they were never promptly discisive for much good or evil; the pulse in congestive cases rarely ever filled up, or became regular from it; in some instances it became quicker and more feeble, during, or soon after rather a small bleeding taken on the first day of the attack. In the inflammatory form also, the same thing was occasionally observed, though in this form, an improved state of the pulse was more frequently the immediate consequence of the loss of blood. The most common sensible effect, however, was relief to the cephalalgia, but

even this advantage was not always gained. In the case referred to above, of the loss of forty-four and a half ounces at one bleeding, the pain, which was distressing to the last degree, was hardly at all relieved, although the pulse was enfeebled by it, and the face made pale at the time, and for several days afterwards. In another instance in which the symptoms, besides the cephalalgia, seemed urgently to call for this remedy, no relief whatever was obtained from it, notwithstanding that both the pulse and skin were greatly affected by it, as in the other case just mentioned, and a tendency to syncope was much complained of during, and for some time after the abstraction of blood;—Nevertheless, prompt and free bleeding in the early stages, and the earlier it seemed the better, must, I think, have been of considerable advantage in this epidemic, in both the congestive and inflammatory forms. Though the benefit was neither immediate nor decisive, yet I cannot doubt, in surveying the whole ground, that time, at least, was gained by it, for other remedies more obviously beneficial to produce their effect. It is certainly true, however, that the impression of the physicians generally, here, in regard to bleeding, even in the bold, and, I may be allowed to add, in reference to others, the judicious manner in which it was applied, was one of disappointment.

Mercury.—This remedy was employed almost exclusively for the purpose of producing its constitutional effects, and so used proved to be a more efficient one than blood-letting, both in the promptness and permanency of its beneficial influence. As a general rule, this object could be speedily obtained, more so, I think, than is common in the phlegmasiæ; there being no tendency to diarrhœa, the medicine never appeared to irritate the bowels, nor did I ever observe that any unfavorable influence of any kind was exerted by it. If not always effectual, it was always safe; and the good obtained by it was more apparent and quite as permanent, as that from all other remedies. It is to be remarked, however, in modification of this general commendation, that in a few instances a salivation having been induced early in the attack, and kept up for several days, failed altogether

in producing any perceptible influence; that in some cases time was not afforded to effect salivation, and that occasionally, though very rarely, when time was had, the specific influence of mercury could not be obtained, neither by inunction, which was a common mode of using it, nor by the internal administration of any of the pharmaceutical preparations in common use.

Rubefacients.—Among this class of remedies, blisters were found to be very valuable applied to the upper part of the vertebral column,—in mild and grave cases they seldom failed to remove, or greatly relieve the cephalalgia, even when bleeding had failed to do so. In the malignant varieties, also, the relief afforded by them was frequently very great. In the congestive forms heat applied to the skin generally, in various ways, mustard plasters, and frictions with oil of turpentine, were frequently beneficial.

Potassæ.—This is a new remedy in cerebral affections, and, as such, I am unwilling to speak of its curative qualities, in the disease under consideration, with the confidence I really feel in it. My experience in its use is yet too limited to determine, positively, its value, but I have seen enough to induce me to continue my observations, and to recommend it to the attention of the profession. I have prescribed it, for several years, in acute hydrocephalus, seemingly with great advantage—I say seemingly, for its effects were never marked by any sudden change for the better, and its claim to merit, in these cases, consequently, must rest merely on the rather equivocal fact, that a very large proportion of those I have treated here by it, have recovered. It was at the suggestion of my friend, Dr. Geo. O. Jarvis, who was detained here by sickness, to whom I communicated my experience of its supposed influence in hydrocephalus, that I was induced to administer it in the still more acute meningo-cerebritis of this epidemic.

The additional evidence which I have thus acquired is more direct, and, consequently, is entitled to more weight, but is yet, as the reader will observe, by no means such as to establish its remedial powers.

In the cerebral affections of children I have prescribed

the carbonate in doses of from half a grain to a grain, repeated every four or six hours. In the epidemic disease, the dose for children was from three to five grains, and for adults, from ten to fifteen grains, repeated every two hours. No case proved fatal, in my practice, nor, so far as I can learn, in either of my professional brethren who used it, in which it was freely and continuously employed. But, it is to be observed, that, under any treatment, the mortality was confined to the malignant forms of the disease; that the remedy was given in but few cases of this kind; and that other remedies of the most energetic kind were also administered along with it; so that it cannot be said to have had its powers fairly tested in any one of them; nor can I say, with any confidence, that all would not have got well without its aid, for I have not sufficient fact on which to express such an opinion; the powers of the remedy were exhibited in a much less equivocal manner, in the grave and mild varieties. In many cases in which there were no febrile symptoms, properly so called, present, the cephalalgia was speedily and permanently relieved; and, in others, its administration was followed by a prompt reduction of arterial excitement, and the removal of intense cephalalgia and other symptoms of head disease, and this in such a manner, and under such circumstances, as to leave no doubt on my mind in regard to the beneficial agency of the medicine. In one chronic case, of the grave variety, in which the patient was fast sinking into a state of dementia, convalescence began on the day that the medicine was first administered. This man had been bled, salivated and blistered without benefit.

Quinine.—I have but little to say, here, in favor of this medicine. Having been taught, by experience, many years ago, that quinine was inadmissible in cerebral inflammation, both in children and in adults, I expected to gain but little from its use, and was not disappointed. I employed it frequently, in the grave variety, to which it seemed most applicable, and sometimes with partial success. When the disease was attended with a fever which was regularly remittent, the meningitis appearing

as an appendage, or as if engrafted on a remittent fever, quinine did occasionally arrest the paroxysms, but more slowly and with greater difficulty than in other fevers. As a remedy in other varieties it cannot be recommended; its use here, if not hazardous, never affording much encouragement to repeat it.

Emetics and Cathartics.—Emetics were but little used. Cathartics were frequently employed as adjuncts, and to effect particular indications, but were not relied on as curative remedies. In two instances a free catharsis induced by drastic medicine was evidently prejudicial.

Narcotics.—Opium was the only remedy of this class which I used. From what I saw of it I can hardly say that it was generally safe to give it in the inflammatory malignant variety, or that it was of any use in the congestive malignant form. In the other varieties it was a safe remedy, and very valuable as an anodyne merely.

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